

**REMARKS**

**Status of the Claims:**

Claims 58 – 76 are currently pending.

Claims 58 – 76 are currently rejected under 35 U.S.C. § 103(a).

Claims 58 – 76 are currently amended.

**Amendments to the Claims:**

No new matter has been introduced by way of the claim amendments.

Claim 58 is presently amended in step a) to recite that the plurality of nanoparticles are arrayed with little or no order. Support for this amendment may be found in the specification in at least paragraph [0039]. Claim 58 is also amended in step a) to recite that the plurality of nanoparticles are between the at least one input lead and the at least one output lead. Support for this amendment may be found in at least Figure 1.

Claims 59 – 74 are each presently amended to correct minor grammatical errors within each claim.

**I. Priority**

Applicants acknowledge the Examiner's recognition of priority given to United States Patent Application 60/220,790, filed July 25, 2000. Office Action page 2, item 1.

**II. Claim Objections**

Applicants acknowledge withdrawal of the Examiner's objection to claims 59 – 76 in view of the amendments filed 11/21/2008. Office Action page 2, item 2.

**III. Claim Rejections Under 35 U.S.C. § 101**

Applicants acknowledge withdrawal of the Examiner's rejection of claims 58 – 76 under 35 U.S.C. § 101 in view of the amendments filed 11/21/2008. Office Action page 2.

**IV. Claim Rejections Under 35 U.S.C. § 112, 2nd Paragraph**

Applicants acknowledge withdrawal of the Examiner's rejection of claim 61 under 35 U.S.C. § 112, second paragraph, in view of the amendments filed 11/21/2008. Office Action page 3, item 1.

**V. Claim Rejections Under 35 U.S.C. § 103**

Applicants also acknowledge withdrawal of the Examiner's rejection of claims 58, 59 and 61 – 76 under 35 U.S.C. § 103(a) as unpatentable over *Andres* and *Tour* in view of the amendments filed 11/21/2008. Office Action page 3, item 2.

Claims 58 – 76 presently stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Seminario*, et al., J. Am. Chem. Soc., 122:2000, pp. 3015 – 3020 (hereinafter, *Seminario*) in view of *Tour*, et al., J. Am. Chem. Soc., 120:1998, pp. 8480 – 8493 (hereinafter, *Tour*). Office Action page 4, item 5. Applicants also acknowledge their obligation under 37 CFR 1.56 to point out any non-common ownership at the time of the invention. Office Action page 3, item 4. Applicants respectfully traverse the rejection of these claims.

*V.1 Examiner's Grounds of Rejection*

The Examiner alleges that *Seminario* teaches self-assembled molecules within a nanopore. The Examiner equates a nanopore with a nanocell. Office Action page 4, item 6. The Examiner alleges that *Seminario* teaches that the random self-assembled molecules (i.e., a random nano-network spanning an input lead and an output lead) are connected to the gold surface (input lead) on one end of the nanocell and through sulfur atoms to the lower surface (output lead). Office Action page 4, item 7. The Examiner alleges that *Seminario* also teaches or makes obvious passing voltage through the molecules, the compound 2',5'-dinitro-4,4'-diphenylacetylene-1,4"-benzenedithiol, sulfur atoms as alligator clips, negative differential resistance, testing the performance of a nanocell, and a linear dimension between 1 nm and 2  $\mu$ m. Office Action pages 4 and 5, items 8 – 13.

The Examiner acknowledges that *Seminario* does not teach programming the nanocell and configuring the molecular circuit components by mortal switching. Furthermore, the

Examiner acknowledges that *Seminario* does not teach molecular switches and diodes, conjugated molecular segments, electronic state, self-adaptive algorithms, logic units, truth tables, memories, and CPUs. Office Action page 5, item 14. However, the Examiner alleges that *Tour* teaches changes in electrostatic potential for information coding (i.e., programming to a desired state). Office Action page 5, item 15. Further, the Examiner alleges that *Tour* teaches configuring a plurality of molecular circuit components and molecular devices configured to behave as electronic devices. Office Action page 5, item 16. Still further, the Examiner alleges that *Tour* teaches input and output current, input and output voltage, and input and output gates (i.e., input and output leads). Office Action page 5, item 16. The Examiner also alleges that *Tour* teaches a random nano-network of molecular circuit components and adjustment of a conductivity affecting property of the molecular circuit components in that electron density is reshaped due to input signals. Office Action page 5, item 17. The Examiner further alleges that *Tour* teaches molecular switches, resonant tunneling diodes, switches connected to input and output leads, conjugated molecules, reshaping electron density (i.e., conformational state), self-adaptive learning algorithms, a logic unit that is a bit adder, logic tables (i.e., truth tables) elements (AND, OR, NOR, NAND), memory, and a CPU. Office Action page 6, items 18 – 25.

In view of the foregoing, the Examiner alleges that it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to have implemented the method of making a nanopore from self-assembled nanoparticles as taught by *Seminario* with the method of using programmable molecular diodes as configurable molecular circuit components as taught by *Tour*. Office Action page 6, item 26.

## V.2 Applicants' Characterization of *Seminario* and *Tour*

*Seminario* teaches a nanopore having molecules that are self-assembled as a monolayer on to a gold surface of the nanopore (see *Seminario*, p. 3015, col. 1). The nanopore further includes a top terminal constructed by gold vapor deposition on to the H-terminated molecules (see *Seminario*, p. 3015, col. 1). As shown in Figure 2 of *Seminario*, the top terminal of gold forms a continuous crystalline lattice layer on the monolayer of molecules.

*Tour* teaches construction of molecular devices in the form of single molecules. The molecular devices can be a two-terminal molecular wire with a tunneling barrier, a molecular

wire with a quantum well (a resonant tunneling diode), three-terminal systems, and four-terminal systems. *Tour* teaches triggering these single molecules by changing the electrostatic potential (see *Tour*, p. 8487, col. 1, paragraph 2). *Tour* also teaches changing the electrostatic potential in one molecule to send a signal to the next molecule and expressly states "there is no need for electron transfer, just a charge reshape" (see *Tour*, p. 8488, col. 1, paragraph 1, emphasis added).

### V.3 Standard for Review

For rejections made under 35 U.S.C. § 103(a), all claim limitations must be taught or suggested by the prior art to establish obviousness. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). Furthermore, "[r]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness". *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007) citing with approval *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006). Likewise, in issuing rejections under 35 U.S.C. § 103(a), the Examiner must consider an invention and the prior art as a whole in accordance with the requisite *Graham* factual inquiries. M.P.E.P. § 2141; *Ruiz v. A.B. Chance Co.* 69 U.S.P.Q.2d 1686, 1690 (Fed. Cir. 2004).

### V.4 Claims 58 – 76 Are Not Obvious

Applicants respectfully assert that independent claim 58 is not obvious in view of *Seminario* and *Tour* at least because these references fail to teach or suggest all of the claim limitations in combination with one another. In particular, neither *Seminario* nor *Tour* teach or suggest a nano-network comprising a plurality of nanoparticles, wherein the plurality of nanoparticles is arrayed with little or no order, as is now required by claim 58.

*Seminario* expressly teaches a nanopore having a monolayer of molecules self-assembled on to a gold surface and interconnected with a top terminal constructed by gold vapor deposition. As shown by the teachings of *Seminario* in Figure 2, the top terminal is a continuous crystalline lattice layer. Likewise, the bottom gold surface is also a continuous crystalline lattice layer as shown in Figure 2. The layers taught by *Seminario* are neither nanoparticles nor suggestive of nanoparticles. Furthermore, *Seminario* does not teach or suggest nanoparticles arrayed with little or no order, as now required by claim 58, since a continuous crystalline lattice layer is inherently

ordered. Accordingly, *Seminario* also does not teach or suggest interconnection of nanoparticles within a nanocell using a plurality of molecular circuit components to provide electrical continuity, since *Seminario* does not teach or suggest the nanoparticles themselves. Likewise, *Tour* does not teach or suggest nanoparticles arrayed with little or no order. *Tour's* silence on nanoparticles has been previously noted in the response of record filed 11/21/2008.

In an alternative view, the Examiner has alleged that the gold surface and top terminal taught by *Seminario* are synonymous with the at least one input lead and the at least one output lead of Applicants' claim 58. Taking this alternative viewpoint, *Seminario* then does not teach or suggest a random nano-network spanning the at least one input lead and the at least one output lead. Such an alleged random nano-network taught by *Seminario* does not include a plurality of nanoparticles between the at least one input lead and at least one output lead, as is now required by claim 58. The absence of nanoparticles between the at least one input lead and the at least one output lead is clearly supported by Figure 2 of *Seminario*. *Tour's* silence on nanoparticles is again noted.

In view of the foregoing, Applicants respectfully assert that *Seminario* and *Tour* do not teach or suggest all of the limitations of claim 58. Hence, claim 58 is not obvious in view of these references. Claims 59 – 76 depend either directly or indirectly from patentable claim 58 and are patentable for at least the same reasons. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). Therefore, Applicants respectfully request that the Examiner's rejection of claims 58 – 76 under 35 U.S.C. § 103(a) be withdrawn.

#### **V. Objection to the Specification**

Applicants note that the Examiner has objected to the specification in the Office Action Summary Sheet. However, no specific objections have been detailed by the Examiner in the Office Action. Hence, Applicants do not believe a specific response is required at this time.

However, in the interest of expediting prosecution, Applicants have amended portions of the specification to correct minor informalities therein. Such amendments are detailed hereinabove in the Amendments to the Specification.

In particular, Applicants have amended the priority claim on page 1 to include application serial numbers that were not included in the priority claim as originally written. Applicants have also amended paragraph [0032] on page 15 of the specification to include an application serial number missing from the text as originally written. Furthermore, Applicants have amended the paragraph following the REFERENCE TO CD-ROM APPENDIX AND STATEMENT UNDER 37 C.F.R § 1.52(e)(5) on page 1 and paragraph [00148] on page 54 to capitalize the trade name Windows in accordance with the requirements of M.P.E.P. 608.01(v).

Applicants believe that these amendments fully address all informalities relating to the specification.

### **CONCLUSIONS**

Claims 58 – 76 remain pending in the application. Applicants respectfully submit that claims 58 – 76, as these claims now stand amended, are in a condition for allowance based on the remarks presented hereinabove.

If additional fees are due and are not included, the Director is hereby authorized to charge any fees or credit any overpayment to Deposit Account Number 23-2426 of Winstead PC (referencing matter 11321-P123US).

If the Examiner has any questions or comments concerning this paper or the present application in general, the Examiner is invited to call the undersigned at 713-650-2764.

Respectfully submitted,

WINSTEAD PC

Attorney/Agent for Applicants

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By: /Robert C. Shaddox/  
Robert C. Shaddox, Reg. No. 34,011  
Farhang Amini, Ph.D., Reg. No. 59,412

P. O. Box 50784  
Dallas, Texas 75201  
Tel: 713.650.2764  
Fax: 214.745.5390